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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/862,557 | 05/22/2001 | Hiroki Kikuchi | 09792909-5025 | 1302 |

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EXAMINER

KIBLER, VIRGINIA M

ART UNIT PAPER NUMBER

2623

DATE MAILED: 06/17/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/862,557

Applicant(s)

KIKUCHI, HIROKI

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: "ans the like" should be changed to "and the like" on page 1, line 8; "e` stage 5" should be changed to "θ stage 5" on page 12, lines 19 and 20 and page 13, lines 6 and 7; "C2 anc C1" should be changed to "C2 and C1" on page 25, line 9; "picked up bu" should be changed to "picked up by" on page 27, line 7; "In there" should be changed to "If there" on page 27, line 20; and "sensor8" should be changed to "sensor 8" on page 29, line 7.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 4, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al. ("A new auto-focus method in critical dimension measurement SEM").

Regarding claim 1, Komatsu et al. ("Komatsu") discloses a distance sensor provided in a fixed geometric relation to the objective lens (Sect. 3, para. 1); means for moving the objective lens in a direction towards or away from the object under inspection (Sect. 3); means for controlling the operation of the moving means (Sect. 2); the controlling means calculating a deviation of the shape of a convex or concave pattern recognized by the distance sensor from the

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real shape of convex or concave pattern to provide a correction value, compensating for an output from the distance sensor with the correction value to determine a target moving distance, and controlling the operation of the moving means according to the target moving distance (Sect. 3, para. 2; Figure 5). Komatsu discloses calculating the deviation based on the data representing the shape of convex or concave pattern of the object under inspection (Sect. 3, para. 1-2) based on a function of the electrostatic capacitance by the distance sensor which thereby entails data representing the spatial sensitivity distribution of the distance sensor. While Komatsu does not appear to explicitly state including a storage means for storing the data representing the shape of the pattern of the object and the data representing the spatial sensitivity distribution of the distance sensor, it would have been obvious in light of his disclosure. Komatsu discloses the focusing control relating to a computer system (Sect. 2). Therefore, it would have been obvious to one of ordinary skill in the art to have modified the data disclosed by Komatsu to explicitly include a storage means for storing the data because it is well known and routinely utilized in the art.

Regarding claim 4, the arguments analogous to those presented above for claim 1 are applicable to claim 4. Komatsu further discloses an illuminating means for illuminating an object under inspection with an illumination light converged by an objective lens (Sect. 2-3); an imaging means for imaging the object under inspection illuminated by the illuminating means (Sect. 3); and an inspecting means for processing an image picked up by the imaging means to inspect the object under inspection (Sect. 2-3).

Regarding claims 3 and 6, Komatsu discloses a capacitance sensor as the distance sensor (Sect. 3, para. 1).

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4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al. ("A new auto-focus method in critical dimension measurement SEM") as applied to claim 4 above, and further in view of Kikuchi et al. (5,760,408).

Regarding claim 7, Komatsu does not appear to disclose the illumination light within an ultraviolet domain. However, Kikuchi et al. ("Kikuchi") discloses including ultraviolet light for illuminating means (Abstract). Komatsu and Kikuchi are combinable because they are from same field of endeavor of illumination systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have modified the illuminations system disclosed by Komatsu to include ultraviolet light. The motivation for doing so would have been because it provides shorter wavelength of light source and is small-sized and inexpensive (Col. 1, lines 5-23). Therefore, it would have been obvious to combine Komatsu with Kikuchi to obtain the invention as specified in claim 7.

5. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al. ("A new auto-focus method in critical dimension measurement SEM") as applied to claims 1 and 4 above, and further in view of Hara et al. (6,172,373).

Regarding claims 2 and 5, Komatsu discloses the data representing a convex or concave pattern of the object under inspection, coordinate data of two points each representing a convex or concave pattern (Sect. 3, para. 1). Komatsu does not appear to disclose recognizing a rectangular area whose diagonal is a line connecting the two points as a real contour of the convex or concave pattern. However, Hara et al. ("Hara") discloses a controlling means that recognizes a rectangular area whose diagonal is a line connecting two points as a real contour of a convex or concave pattern (Figures 2-5; Abstract). Komatsu and Hara are combinable because

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they are from the same field of endeavor auto-focus control. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have modified the coordinate data disclosed by Komatsu to include recognizing a rectangular area. The motivation for doing so would have been because it allows for the calculation and thereby correction of a leveling amount. Therefore, it would have been obvious to combine Komatsu with Hara to obtain the invention as specified in claims 2 and 5.

Other Prior Arts Cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 4,725,722 to Maeda et al. for automatic focusing utilizing contrasts of projected pattern;

U.S. Pat. No. 5,661,548 to Imai for projection exposure including changing the reference image-formation position used to generate a focus signal; and

U.S. Pat. No. 5,576,831 to Nikoonahad et al. for wafer alignment sensor.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Virginia Kibler

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06/10/04

**MEHRDAD DASTOURI
PRIMARY EXAMINER**

Mehrdad Dastouri